



MAUPP Modelling and forecasting African Urban Population Patterns for vulnerability and health assessments

Programme
STEREO III

Contract
SR/00/304

Start - End
1 October 2014 - 30 September 2018

Project type
Thematic network

<https://eo.belspo.be/MAUPP>
<https://eo.belspo.be/MAUPP-webstory>

Context and objectives

Africa's population is predicted to double over the next 40 years, driving exceptionally high urban expansion rates. Urbanization has profound social, environmental and epidemiological implications and makes spatial and quantitative estimations of urban change, population density and socio-economic characteristics valuable information for epidemiology and vulnerability assessment.



The performance of urban expansion models largely depends on the quality and type of data available. These so far have been limited, which reduced the confidence and the applications of models for Africa. Satellite remote sensing offers an effective solution for mapping settlements and monitoring urbanization at different spatial and temporal scales and allows to link empirical observations with urban theory. Moreover, remote sensing data have a great potential to map and predict intra-urban variations in population density because they provide information on the morphology of different residential patterns that can be linked to different population densities and socio-economic parameters.

The project addresses two specific objectives:

- Produce an urban expansion model at moderate spatial resolution for African cities.
- Understand and predict intra-urban variations in human population density in Africa.

Project outcome

Results

- Automated methods for urban detection in sub-Saharan Africa, combining different types of remote sensing data.
- Identification of geographical factors that control extension of SSA cities and help to understand their spatial structure.
- Identification of geographical predictors of population densities within cities.
- Identification of the relationships between HRRS and VHRRS landscape attributes.



Products and services

All the methods were developed with a particular focus on automation and transferability. The mapping frameworks and other computer code developed as well as the final maps are made available through different public repositories, at no cost, for anybody and for any purpose:

- Data sets repositories: <https://zenodo.org/search?page=1&size=20&q=MAUPP>
- Frameworks and computer code: github.com/tgrippa and github.com/yannforget.

Potential users

- Researchers and policy makers based in the government ministries and associated organizations of all of the low-income countries to support development, health and planning purposes.
- International organizations and agencies, such as the International Red Cross, World Bank, UN-FAO, UNDP, MSF, Clinton Health Access Initiative, DFID, MapAction.
- Researchers in public health, population health and urban planning.

Mapping urban land use at street block level using OpenStreetMap, remote sensing data and spatial metrics

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Land cover

- High buildings
- Low vegetation
- Bare soils
- Water bodies
- Medium buildings
- Trees
- Asphalt surfaces
- Swimming pools

Land use

- Planned residential
- Planned residential (low density)
- Bare soils
- Non-residential
- Unplanned residential
- Unplanned residential (low density)
- Vegetation
- Uncertain

Project leader(s)

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Location

African cities

Website

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